

BUCHA, Vaclav

Investigation of magnetic fields by artificial satellites and interplanetary probes. Cs cas fys 15 no.1:29-41 '65.

1. Institute of Geophysics of the Czechoslovak Academy of Sciences, Prague. Submitted October 12, 1964.

I 34686-66 EWT(1)/GW

ACC NO. AF0025060

SOURCE CODE: CZ/0023/65/009/003/0272/0289

AUTHOR: Bucha, Vaclav

ORG: Geophysical Institute, CSAV, Prague

TITLE: Archaeomagnetic research into the total geomagnetic field intensity and its changes in Czechoslovakia

SOURCE: Studia geophysica et geodastica, v. 9, no. 3, 1965, 272-289

TOPIC TAGS: geomagnetic field, earth magnetism, magnetic field intensity

ABSTRACT: The results presented in this paper, covering a considerable period, show that the intensity of the geomagnetic field, in comparison with the present-day intensity, was highest at the beginning of the present era. Going backwards in time, the values of the intensity decrease to a minimum at about 3600 B.C., that is, to about one half of the present-day intensity. The curve for the investigated time interval supports evidence that the minimum really existed and that the long-term changes of the geomagnetic field have a periodic character and a period of about 8000 years. Orig. art. has: 12 figures. [Orig. art. in Eng.] [JPRS: 32,859]

SUB CODE: 08, 20 / SUBM DATE: 07Sep64 / ORIG REF: 002 / SOV REF: 002

OTH REF: 003

Cord 1/1 ULR

L 57444-65 EWT(d)/EWP(w)/EWA(d)/EWP(v)/EWP(k)/EWA(h) Pf-4/Peb LJP(c) WW/EM

ACCESSION NR: AP5019301

CZ/0026/64/009/005/0328/0340

AUTHOR: Buchacek, Karel (Bukhachek, K.)

TITLE: Contribution to the geometrical nonlinear theory of hyperbolic paraboloidal shells

SOURCE: Aplikace matematiky, v. 9, no. 5, 1964, 328-340

TOPIC TAGS: shell structure, geometry, applied mathematics, structure stability, solid mechanics

Abstract [Author's English summary]: The paper deals with a computation of strain in a shallow hyperbolic paraboloidal shell of a square ground plan supported by a space frame construction and loaded with a uniformly distributed hydrostatic pressure. A general method of determining the stress and strain in the shell is explained. An actual solution is presented of the problem under the assumption of simplified boundary conditions and preservation

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ACCESSION NR: AP5019301

of some general parameters of the construction. Results prove that the shell deflects stably and that the membrane theory gives wrong results in practice, especially for shallow shells.
Orig. art. has: 6 figures, 23 formulas, 2 graphs.

ASSOCIATION: Ustav teoreticke a aplikovane mechaniky CSAV, Prague
(Institute of Theoretical and Applied Mechanics (CSAV))

SUBMITTED: 11Nov63

ENCL: 00

SUB CODE: AS, MA

NR REF SOV: 002

OTHER: 001

JPRS

24/ 2/2
2012

83135

S/020/60/133/005/013/019
B016/B060

5.3200

5.4700

AUTHORS: Likhtenshteyn, G. I., Buchachenko, A. L., Vedeneyev, V. I.

TITLE: A Semiempirical Method of Calculating the Formation Heats of Hydroperoxides and the Conjugation Energies of Some Peroxide Radicals 1

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 5, pp. 1102-1104

TEXT: For the calculation of the energetics of reactions in which hydroperoxides take part, it is necessary to know the formation heats of the latter. The scarce experimental data on ΔH of hydroperoxides do not permit the use of the well-known semiempirical calculation methods (Refs. 1,2) when calculating the formation heats of organic hydroperoxides. The method suggested here is based on the following considerations: following the ideas developed by N. N. Semenov (Refs. 3,4), the magnitude of the bond energy $X - Y$ (Q_{XY}) can be represented as follows: $Q_{XY} = E_{XY} - B_X - B_Y$, where E_{XY} is the splitting

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Conjugation Energies of Some Peroxide Radicals

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energy of the X - Y bond. In this connection, the electron configurations of the free X and Y are assumed to remain equal to those in the initial molecule. B_X and B_Y are the conjugation energies of the radicals X and Y.

Consequently, the authors write down equations (1), (2), and (3) for compounds of the types $XOOX$ and $XOO\cdot$. It follows from the law of energy conservation that the identity $A_1 + A_2 = A_1^0 + A_2^0 = \text{const}$ (4) is preserved regardless of the nature of X, with $A_1^0 + A_2^0$ being the sum of two three-

electron bonds in the oxygen molecule. In fact, the transition from the state $XOOX$ to the state $2X + O_2$ can be realized in two ways: a) by the simultaneous splitting of both OX bonds under energy consumption (5), or b) by the successive cleavage of X from $XOOX$ and from XO_2 (6). The combination of equations (1), (2), (5), and (6) yields equation (4) which may be regarded as a thermodynamic criterion for the fact that all of the compounds discussed here correspond to the chemical formulas ascribed to them, that they are tuned thermodynamically, and that they obey the rule of additivity. The numerical calculation of A_1 and A_2 on the basis

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of equations (1), (2), and (3) was carried out for cases in which $X = H, Cl, ClO, R, F$, with R being a hydrocarbon radical. The data used for the calculations are shown in Table 1. It follows from Fig. 1 that the value $A_1 + A_2 = A_1^O + A_2^O = 82 \pm 2$ kcal (4') and is independent of the

nature of X . Equation (4') allows the calculation of the formation heats of hydroperoxides (Equations (7), (8), and (9)). Fig. 2 shows that the points corresponding to the experimental results (Refs. 5,6) lie well on the straight line calculated on the basis of equation (9). The constancy of the values $A_1 + A_2$ for different compounds and the applicability of relation (9) for hydroperoxides of different classes allow a fairly reliable calculation of the formation heats of such hydroperoxides for which no experimental data are available, by means of a comparison with the known formation heats of corresponding alcohols. This again permits the splitting energies of the $O-O$ bonds to be calculated. Fig. 1 shows that the conjugation energy of the peroxide radicals drops with decreasing electronegativity of the atom which is directly added to oxygen. Other possibilities of applying equation (4') are finally

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A Semiempirical Method of Calculating the
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B016/B060

mentioned. There are 2 figures, 1 table, and 8 references: 6 Soviet and
2 US.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR
(Institute of Chemical Physics of the Academy of Sciences,
USSR)

PRESENTED: March 21, 1960, by V. N. Kondrat'yev, Academician

SUBMITTED: March 18, 1960

Card 4/4

3487h
S/081/62/000/003/020/090
B151/B144

5.3300

AUTHORS: Buchachenko, A. L., Neyman, M. B., Kagan'skaya, K. Ya.
TITLE: Photochemical liquid-phase oxidation of trimethyl heptane,
and effect of inhibitors on the rate of oxidation
PERIODICAL: Referativnyy zhurnal. Khimiya, no. 3, 1962, 72, abstract
3B481 (Tr. po khimii i khim. tekhnol. (Gor'kiy), no. 1,
1961, 31-38)

TEXT: Liquid-phase photochemical oxidation of 2,4,6-trimethylheptane (I) by oxygen is carried out at 6-80°C in the presence of anthraquinone as a sensitizer. From the rate of oxidation of I the ratio of the rate constant of the chain growth reaction (k_1) to the square root of the rate constant of the chain rupture reaction (k_2) is determined. The values of $k_1 = 3.2 \cdot 10^{-16} \exp(-9100/RT) \text{ cm}^3 \cdot \text{sec}^{-1}$ and of $k_2 = 5.8 \cdot 10^{-6} \text{ cm}^3 \cdot \text{sec}^{-1}$ are determined using the rotating sector method. For studying the inhibited oxidation of I diphenyl amine is used as inhibitor. From the dependence

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Photochemical liquid-phase...

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of the rate of the inhibited oxidation on the inhibitor concentration the inhibition constant $k_3 = 1 \cdot 10^{-16} \exp(-3500/RT) \text{ cm}^3 \cdot \text{sec}^{-1}$ is found. By oxidizing I in the presence of diphenyl amine, deuterized in the amino group, a small kinetic isotopic effect is found, equal to 1.25-1.30 at 59.3°C. Using electron paramagnetic resonance the presence of a stable diphenyl nitrogenous radical formed on oxidation of I in the presence of diphenyl amine has been found. [Abstracter's note: Complete translation.] L

Card 2/2

S/081/62/000/005/007/112
B158/B110

11.1510
AUTHORS:

Buchachenko, A. L. Neyman, M. B. Lebedev, Ya. S.

TITLE:

Investigation of radical reactions of antioxidants in liquid phase by the method of electronic paramagnetic resonance

PERIODICAL:

Referativnyy zhurnal. Khimiya, no. 5, 1962, 59, abstract 5B380 (Tr. po khimii i khim. tekhnol. (Gor'kiy), no. 1, 1961, 39 - 43)

TEXT: By the method of electronic paramagnetic resonance it is shown that stable radicals are formed when a number of active radicals, obtained by decomposing benzoyl peroxide, cyclohexyl percarbonate, p-tert-butyl cumene peroxide, etc., in the presence of a catalyst, are reacted with antioxidants - aromatic amines, alkyl substitution phenols, naphthols, etc. Their lifetimes in a solution of toluene or benzene (in liquid phase) range from several minutes to several hours depending on the nature of the radicals and the temperature. For a number of antioxidants - phenols and amines - it was possible to identify the structures of the radicals formed and to study

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Investigation of radical reactions ...

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their conversions as well as formation mechanism. [Abstracter's note:
Complete translation.]

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S/062/61/000/010/003/018
B117/B101

11. 1510

AUTHORS: Neyman, M. B., and Buchachenko, A. L.

TITLE: Investigation of the structure and reactivity of some stable radicals

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 10, 1961, 1742 - 1748


TEXT: The present paper was presented at the general meeting of the Otdeleniye khimicheskikh nauk Akademii nauk SSSR (Department of Chemical Sciences of the Academy of Sciences USSR) in Moscow, June 22, 1961. It contained some new data on stable radicals, their structure, physical properties, and chemical reactions. 40 kinetically stable radicals were obtained by oxidation of phenol derivatives and secondary aromatic amines with organic peroxides, percarbonates, or PbO_2 in benzene or toluene solutions. The radical solutions are colored. Some radicals form colored crystals after evaporation of the solvent. The electron paramagnetic resonance (epr) spectra of the resulting radicals exhibit a fine structure, owing to interaction of the electron spin with the magnetic moments of

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hydrogen and nitrogen nuclei. If the magnetic moment of an unpaired electron interacts only with one proton whose spin is $1/2$, the epr spectrum will show a doublet. Interaction of an unpaired electron with two hydrogen atoms of the benzene ring in meta-position results in a triplet structure of the epr spectrum. Interaction of the unpaired electron with three hydrogen atoms of the methyl group in para position gives rise to a quadruplet structure in the epr spectrum. On weak interaction with two hydrogen atoms of the benzene ring in meta-position each line of the quadruplet is split up into three components. The interaction of the unpaired electron with a nitrogen nucleus whose spin is 1, gives a triplet in the epr spectrum. The lines of this triplet are split up into 15 components on weak interaction of the electron with non-equivalent protons of the benzene ring. Even more lines were observable in the epr spectrum on interaction of the dislocated electron with the nitrogen nucleus and with hydrogen nuclei in benzene rings and methoxy groups. In the absence of oxygen, the radicals in question have a long lifetime at room temperature, which permits the investigation of their physical and chemical properties. Some of the radicals can be sublimed in vacuo at $\sim 100^\circ\text{C}$ without decomposition. They form crystals on cold surfaces, and can be determined by the



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epr method. In co-operation with E. G. Gintsberg and B. M. Kovarskaya, absorption spectra of some antioxidants and their radicals were studied in the ultraviolet and infrared. The shift of the absorption bands from the ultraviolet to the visible region, observed during radical formation, explains the coloration of their solutions and crystals. Infrared spectra disclosed that the intensity of the absorption line of hydroxyl at 2.8μ is reduced with a partial formation of the radical and that new lines appear round 6.2μ . The polarographic reduction of kinetically stable radicals in alcohol solutions on an LiCl background was shown to be possible in the potential range of 0.35 - 0.45 v. If the radical contains a polarographically active group, the free valency and this group can be reduced independently at corresponding potentials. The radicals in question cannot dimerize, presumably owing to steric hindrances. They are, however, able to break off the hydrogen from other molecules, e.g. from the solvent, thus forming molecules of the initial phenols. The kinetics of this reaction was studied at different temperatures (90 - 150°C). This reaction was found to be described by a second-order equation. A number of reactions between kinetically stable radicals and molecules of various substances in solutions were examined by the epr

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method. These radicals can be used to investigate the reactivity of various bonds. When kinetically stable radicals are used, their separation from each other and from ordinary molecules is an extremely important problem which can often be solved with the aid of paper chromatography. This was exemplified by the separation and identification of the radicals formed in the oxidation of ionol (2,6-di-tert-butyl-4-methyl-phenol) by this method. Ye. K. Zavoyskiy, Razuvayev, Khidekel, Gorbunova, and M. S. Khloplyankina and the monography by O. A. Reutov: *Teoreticheskiye problemy organicheskoy khimii* (Theoretical Problems of Organic Chemistry), Izd. MGU, M., 1956, are mentioned. There are 9 figures and 7 references: 3 Soviet and 4 non-Soviet. The two references to English-language publications read as follows: J. K. Becconsall, S. Clough, G. Scott, *Trans. Faraday Soc.*, 56, 459 (1960); C. Cook, *J. Organ. Chem.*, 18, 261 (1953).

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: June 22, 1961

Card 4/4

BUCHANCHENKOV, A.L.; KAGANSKAYA, K.Ya.; NEYMAN, M.B.; PETROV, A.A.

Study of the mechanism underlying the oxidation of 2,4,6-trimethylheptane with the use of the intermittent illumination method.
Kin. i kat. 2 no.1:44-49 Ja-F '61. (MIRA 14:3)

1. Institut khimicheskoy fiziki AN SSSR.
(Heptane)

BUCHACHENKO, A.L.; KAGANSKAYA, K. Ya.; NEYMAN, M.B.

Inhibited oxidation of 2,4,6-trimethylheptane. Kin. 1 kat. 2
no.2:161-164 Mr-Ap '61. (MIRA 14:6)

1. Institut khimicheskoy fiziki AN SSSR.
(Heptane)

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28974
S/192/61/002/005/001/005
D202/D304

AUTHORS: Buchachenko, A.L., Lebedev, Ya.S. and Neyman, M.B.

TITLE: Investigating anti-oxidant radicals by means of
electronic para-magnetic resonance
I. Phenoxyradicals

PERIODICAL: Zhurnal strukturnoy khimii, v. 2, no. 5, 1961,
558-561

TEXT: This experimental work is similar to that published by Becconsall and others in 1960, the difference between these two investigations lying in the use of active compounds, capable of splitting off hydrogen from the phenol. The Western scientists used lead peroxide and the Russians benzoyl peroxide, cyclohexyl percarbonate and p-tert-butylcumene hydroxy-peroxide with cobalt stearate to catalyze the decomposition. The authors state that the Western investigation was published when theirs

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was virtually finished. After briefly discussing the phenoxy-radicals theory, based on Western publications, the authors state that their object was to obtain stable phenoxy-radicals and to study their structure and life-span; it was found that the latter amounted to hours. Substituted phenols used in the present work are given in the Table together with the characteristics of their spectra. Experiments were carried out in sealed thin glass tubes in toluene solutions, with compounds in the ratio of 1:1; the tubes were heated to 50-80°C, put in the resonator of the EPR spectrometer and the first derivatives of absorption spectra recorded on a self-recording EPR-09 potentiometer. The equipment was previously described by A.G. Semenov and N.N. Bubnov (Ref. 5: Pribury i tekhnika eksperimenta, 1, 92, 1959). The authors discuss in detail, the spectrum of 2,6-di-tert-butyl-4-methyl phenoxy radical, obtained by the action of benzoyl peroxide, cyclohexyl percarbonate or diphenyl-picryl hydrazine (DPPH); with the last component the formation of the phenoxy-

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radical took place even at room temperature. The same results were obtained by irradiating 2,6-di-tert-butyl-4-methyl phenol with high-speed electrons; the irradiation experiments were performed together with A.T. Koritskiy and A.P. Ivanovskiy. Passing oxygen through a solution of this compound with benzoyl peroxide for two hours at 100 °C did not change its spectrum and affected only slightly the intensity of the oxygen signal. The authors failed to obtain radical spectra from hydroquinone, p-nitro-benzene, p-cresol and unsubstituted phenol. They claim that their results disprove the hypothesis of a molecular phenol-benzoyl peroxide reaction; the impaired electron is delocalized along the II bonds of the benzene ring and the greatest density is centered around the para-position in respect to the oxygen atom. It is proposed to continue the investigations with other substituted phenols and to study the kinetic characteristics. There are 1 table, 3 figures and 8 references: 3 Soviet-bloc and 5 non-Soviet-bloc. The references to the 4 most recent

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Investigating anti-oxidant ,,,

25-74
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D202/D304

English-language publications read as follows: A. M. Kozlov,
E. Kooyman, Y. Chem.Soc., 3211 (1953); D. Davies et al. J. Chem.
Soc., 4926 (1956); Ch. Walling, J. Amer. Chem. Soc., 80, 213
(1958); Y.K. Beconsall, S. Clough, C. Scott, Trans.Faraday
Soc., 56, 459, (1960)

ASSOCIATION: Institut khimicheskoy fiziki, AS SSR (Institute
of Chemical Physics AS USSR)

SUBMITTED: July 14, 1960

Card 4/6
4

BUCHACHENKO, A.L.; NEYMAN, M.B.

Conversions of the radical formed in polyformaldehyde under the
effect of gamma rays. Vysokom.soed. 3 no.8:1285-1286 Ag '61.
(MIRA 14:9)

(Formaldehyde) (Radicals (Chemistry)) (Gamma rays)

25862
S/020/61/139/004/022/025
B127/B212

11.1510

AUTHORS: Buchachenko, A. L. and Neyman, M. B.

TITLE: Separation of free radicals by the paper chromatography method

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 4, 1961, 916-918

TEXT: The authors studied the radicals of 2,6-ditertiary-butyl 4-methyl-phenol (ionol). Radicals are formed by cracking of hydroxyl hydrogen, which, in turn, may form radicals. Both reactions proceed simultaneously; therefore, the electron paramagnetic resonance spectra overlap. The e.p.r. spectrum of the first ionol radical showed a quadruplet structure with a distance of 11.4 oersteds between the components and an intensity ratio of 1:3:3:1. The quadruplet results from interaction of an unpaired electron with protons of the methyl group in para-position with respect to the oxygen atom. Each quadruplet component was split into three lines of an intensity ratio of 1:2:1 (distance 1.7 oe). This hyperfine structure is caused by the two equivalent protons in meta-position in the

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benzene ring. In order to separate the radicals by paper chromatography, toluene, ethyl alcohol, or carbon tetrachloride were used as mobile phase (flow medium). Best separation was attained with the use of 96% ethyl alcohol. In this case, the band of the ionocloxide solution showed clear separation into two fronts: a lower orange front with $R_f = 0$, and an upper yellow one with $R_f = 1$. After drying, each part of the chromatogram was investigated with an EPR-2 (EPR-2) spectrometer, and the e.p.r. spectra were recorded. The e.p.r. spectrum of the second ionol radical showed a doublet (1:1; distance 14.5 oe) in solid state, and a triplet (1:2:1; 8.2 oe) in solution (benzene, toluene, CCl_4). The components of the latter are likewise split into three lines each (1:2:1; 1.8 oe). The doublet-triplet transition was found to be reversible. Thus, an e.p.r. spectrum analysis makes it possible to study the behavior of radicals in solid or liquid states. The authors mention that the above method of paper chromatography may be used also for separating radical and molecule. Here, the first front comprises the radical, and the second, immovable front, the molecule. There are 4 figures and 7 references:

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Separation of free radicals by the...

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B127/B212

3 Soviet-bloc and 4 non-Soviet-bloc. The two most recent references to English-language publications read as follows: Ref. 2: K. J. Beeconsall, S. Clough, G. Scott, Trans. Farad. Soc., 56, 459 (1960); Ref. 6: W. Gordy, C. G. McCornic, J. Am. Chem. Soc., 78, 3243 (1956).

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

PRESENTED: April 7, 1961, by V. N. Kondrat'yev, Academician

SUBMITTED: April 3, 1961

Card 3/3

KHIDEKEL', M.L.; BUCHACHENKO, A.L.; RAZUVAYEV, G.A.; CORBUNOVA, L.V.;
NEYMAN, M.B.

Oxidation of β -naphthol and some of its derivatives by
peroxide compounds. Dokl. AN SSSR 140 no.5:1096-1099 0
'61. (MIRA 15:2)

1. Nauchno-issledovatel'skiy institut khimii pri Gor'kovskom
gosudarstvennom universitete im. N.I.Lobachevskogo i Institut
khimicheskoy fiziki AN SSSR. 2. Chlen-korrespondent AN SSSR
(for Razuvayev).

(Naphthol)
(Peroxides)

NEYMAN, M.B.; MAMEDOVA, Yu.G.; BLENKE, P.; BUCHACHENKO, A.L.

Kinetics of reactions between a tritertiary butyl phenoxy radical and certain hydrocarbons. Dokl.AN SSSR no.2:392-394 My '62. (MIRA 15:5)

1. Institut khimicheskoy fiziki AN SSSR. Predstavleno akademikom V.N.Kondrat'yevym.
(Hydrocarbons) (Radicals (Chemistry))

41337

S/020/62/146/003/013/019
B101/B144

5.4600

AUTHORS: Kuz'minskiy, A. S., Neyman, M. B., Fedoseyeva, T. S.,
Lebedev, Ya. S., Buchachenko, A. L., Chertkova, V. F.

TITLE: Conversions of free radicals in gamma-irradiated polyisoprenes

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 146, no. 3, 1962, 611-614

TEXT: The initial stage of cis- and trans-polyisoprene structuration caused by 10-50 Mrad Co⁶⁰ irradiation was studied. The appearance and disappearance of free radicals was ascertained by recording the epr spectrum. An epr spectrum with a signal width of 14 oersteds was observed on trans-polyisoprene after irradiation at room temperature in vacuo. The structure of the radical causing this signal could not be clarified; probably it was formed by separation of a hydrogen atom from the α -methylene group. At -196°C, irradiated trans-polyisoprene showed a broad singlet due to superposition of various radical spectra. If air was admitted to the ampoule at room temperature, the spectrum passed over into a peroxide spectrum. No epr spectrum appeared in cis-poly-

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Conversions of free radicals ...

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isoprene at room temperature, owing to quick radical recombination. At -196°C , cis-polyisoprene showed a spectrum similar to that of trans-compound. The concentration of free radicals at -196°C was higher than at room temperature. The kinetics of disappearance of free radicals is described by an equation of second degree and corresponds to the recombination $R^{\cdot} + R^{\cdot} \rightarrow$ stable product. As the slope of the straight lines representing the "reciprocal concentration of free radicals versus time" depends on the dose, it is concluded that in the case of high doses the recombination is impeded by steric hindrances in the amorphous part of the polymer. The following effective constants of radical disappearance have been calculated:

Dose, $r \cdot 10^{-6}$	10	20	37	47
$K_{\text{eff}}, \text{sec}^{-1} \cdot 10^4$	6.25	4.33	3.34	2.74

Calculation of the degree of cross linking according to P. L. Flory (J. Chem. Phys., 11, 521 (1943)) showed that at 10 Mrad about 600 isoprene units were between two cross links, that the number of cross links increased with the dose, and that at 150 Mrad 1.2 isoprene units were between two cross links. The steady decrease of K with increasing

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Conversions of free radicals ...

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B101/B144

number of cross links also proves that with increasing density of the network the mobility of molecular chains is impeded and the recombination of free radicals is rendered difficult. There are 4 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry). Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR) f

PRESENTED: May 21, 1962, by V. N. Kondrat'yev, Academician.

SUBMITTED: May 25, 1962

Card 3/3

S/051/62/013/006/006/027
E039/E120

AUTHOR: Buchachenko, A.L.
TITLE: Electron paramagnetic resonance spectra of some
new radicals

PERIODICAL: Optika i spektroskopiya, v.13, no.6, 1962, 795-800

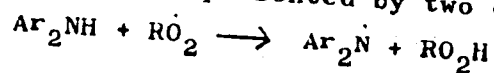
TEXT: The structure of the radicals formed by the action of the peroxide radicals on various aromatic amines is investigated. This work is of interest because of the wide use of aromatic amines as inhibitors in oxidation processes. The radicals are prepared by mixing hydrogen peroxide with a hydrocarbon solution and the investigated amine, and heating rapidly together with cobalt salts to a temperature of 50 - 80 °C. The mixture is then cooled quickly to obtain the greatest concentration of the radical. For some amines the degree of conversion is 10% or more. Purification of the new radical formed is achieved by the use of chromatographic paper and vacuum distillation. In addition some specially synthesised radicals of the aryl oxides of nitrogen are investigated. Comparison of the properties of these radicals, their kinetic characteristics and electron paramagnetic resonance

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Electron paramagnetic resonance ...

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E039/E120

spectra shows that the radicals obtained from the amines also occur in the aryl oxides of nitrogen. Their mechanism of formation can be represented by two equations:



Details of the e.p.r. spectra are illustrated and analysed. There are 9 figures.

SUBMITTED: October 16, 1961

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35669

S/020/62/143/001/024/030
B101/B147

15.8061

AUTHORS: Buchachenko, A. L., Khloplyankina, M. S., Neyman, M. B.

TITLE: Formation of inhibitor radicals in polypropylene oxidation

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 1, 1962, 146 - 149

TEXT: Isotactic polypropylene powder with an inhibitor dissolved in alcohol was pressed into 100 μ films (150 kg/cm², 120°C in a CO₂ atmosphere. The inhibitor concentration of the films was $7 \cdot 10^{-2}$ - $9 \cdot 10^{-2}$ moles/kg. The epr spectrum was taken at 20 - 250°C (heating by blowing in hot air). α -naphthol, β -naphthol, binaphthol, 2,6-di-tert-octyl-4-methyl phenol, and diphenyl amine, Ph₂NH, were used as inhibitors. Owing to loss of the H atom in the hydroxyl group, radicals formed with epr spectra consistent with those of the individual inhibitors in the model test. α -naphthol and β -naphthol showed singlets (widths: 3 and 5 oe, respectively). Conjunction of the unpaired electron (UE) on the α -naphthoxyl radical with the π bonds

Card 1/3

Formation of inhibitor ...

S/020/62/143/001/024/030
B101/B147

of the naphthyl ring is more intense than that of the β -radical. The triplet of binaphthol is caused by the reaction of UE with two equivalent protons. Intensive interaction of UE and the protons of the p-methyl group in di-octyl methyl phenol yielded a quadruplet every line of which was split into three lines due to interaction with meta protons. On reacting Ph_2NH with peroxide radicals, Ph_2NO was formed which showed a uniform triplet (width 10.3 oe) caused by reaction of UE with the N^{14} nucleus. Every component was split into 15 lines due to interaction with the o-protons and p-protons of the benzene ring. The hyperfine structure occurring with greater dilution is caused by m-protons. In the initial section, the radical concentration curves were of autocatalytic character. The concentration then increases and goes through a maximum. Comparison with polypropylene powder containing an inhibitor showed its induction period to be considerably reduced. The inhibitor efficiency thus depends on its introduction into the polymer. As compared with α -naphthol, the radical concentration in the presence of β -naphthol was lower according to the lower stability of β -naphthol radicals. The same holds for all above

Card 2/3

Formation of inhibitor ...

S/020/62/143/001/024/030
B101/B147

inhibitors. The majority of radicals are formed by chain rupture during oxidation, a complicated process with degenerate branches. N. B. Neyman's kinetic isotope method might yield quantitative data on the kinetics of inhibitor consumption and O_2 absorption. There are 3 figures and 4

references: 3 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: O. L. Harle, J. R. Thomas, J. Am. Chem. Soc., 79, 2973 (1957).

PRESENTED: October 9, 1961, by V. N. Kondrat'yev, Academician

SUBMITTED: October 9, 1961

Card 3/3

KUZ'MINSKIY, A.S.; NEYMAN, M.B.; PEDOSEYEVA, T.S.; LEBEDEV, Ya.S.; BUCHACHENKO,
A.L.; CHERTKOVA, V.F.

Transformations of free radicals in γ -irradiated polyisoprenes.
Dokl. AN SSSR 146 no.3:611-614 S '62. (MIRA 15:10)

1. Nauchno-issledovatel'skiy institut resinovoy promyshlennosti i
Institut khimicheskoy fiziki AN SSSR. Predstavleno akademikom V.N.
Kondrat'yevym.
(Radicals (Chemistry)) (Gamma rays) (Isoprene)

I 12720-63

ACCESSION NR: AP3002296

FPP(c)/ZWP(j)/EWT(m)/BDS

Pr-L/PC-L RM/WW

S/0062/63/000/006/1118/1120

AUTHOR: Buchachenko, A. L.; Sdobnov, Ye. I.; Rafikov, S. R.; Neyman, M. B.

TITLE: Reactivity of diethyl phosphite in radical reactions with tritertiary butyl phenoxyl

SOURCE: AN SSSR. Izv. Otdeleniye khimicheskikh nauk, no. 6, 1963, 1118-1120

TOPIC TAGS: diethyl phosphite, tritertiary butyl phenoxyl, dimerization, kinetic method, degree of solvation

ABSTRACT: The reaction of tertiary butyl phenoxyl with diethyl phosphite proceeds with abstraction of the phosphine hydrogen from monomeric tautomer containing pentavalent phosphorous. The rate constant in benzene at 20 degrees was found to be $k_{sub 1} = 1.2 \times 10^{sup -25}$ cc/sec and the equilibrium constant for the dimerization of diethyl phosphite, $K = 7.5 \times 10^{sup -21}$ cm $^{sup -3}$. The procedure developed provides a general kinetic method for determining degree of solvation of the reaction center. Orig. art. has: 3 figures.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics); Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR

Card 1/2

I, 12719-63
 ACCESSION NR: AP3002297
 EPF(c)/EWP(j)/EWT(1)/EWT(m)/BDS AFFTC/ASD/ESD-3 Pr-4/Pc-4/P1-1
 S/0062/63/000/006/1120/1123 RM/KW/JFW-75
 74

AUTHOR: Buchachenko, A. L.

TITLE: Electron paramagnetic resonance spectra of several new stable radicals

SOURCE: AN SSSR. Izv. Otdeleniye khimicheskikh nauk, no. 6, 1963, 1120-1123⁷

TOPIC TAGS: electron paramagnetic resonance spectra, stable radicals, EPR spectra, aphenoxy radical, unpaired electron dislocation

ABSTRACT: The EPR spectra were obtained for aphenoxy and phenylazoto Ph NOH radicals. Analysis of the spectra shows that the unpaired electron is dislocated by a system-conjugated bonds. Comparison of the EPR spectra of negative ion radicals of the type Ph-CH sub 2 -Ph and radicals of similar structure indicates a significantly smaller frequency of unpaired electron dislocation between two phenyl rings in uncharged radicals; this is connected with the difference in the behavior of the molecular orbits of that electron. The transition of the original radicals were analyzed and their possible mechanism discussed. "This phenol was obligingly supplied to us by F. Yu. Rachinski (Leningrad)." Orig. art. has: 7 formulas and 3 figures.

Association: Inst. of Chemical Physics, Academy of Sciences SSSR

Card 1/21

S/020/63/148/001/019/032
B101/B186

AUTHORS: Buchachenko, A. L., Gur'yanova, Ye. N., Kalashnikova, L.A.,
Neyman, M. B.

TITLE: Dipole moments of the diphenyl nitrogen oxide radical and
of the diphenyl hydroxylamine molecule

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 1, 1963, 95-96

TEXT: The molar polarization P_{∞} at infinite dilution and the molar
refraction R_D for the D line of sodium of $C_6H_5-N-C_6H_5$ (I) and of
 $C_6H_5-N-C_6H_5$ (II) were determined in benzene at 25°C. The dipole moment
was calculated according to $\mu = 0.22 \sqrt{P_{\infty} - R_D}$. Data found for I: m.p. =
64°C, $P_{\infty} = 240.8$, $R_D = 55.8$, $\mu = 3.0 \cdot 10^{-18}$, and for II: m.p. = 60°C,
 $P_{\infty} = 91.8$, $R_D = 56.9$, $\mu = 1.3 \cdot 10^{-18}$. The discussion of these μ values
leads to the conclusion that no additivity exists and that μ for I cannot

Card 1/2

Dipole moments of the diphenyl ...

S/020/63/148/001/019/032
B101/B186

be calculated from μ for II. The difference between μ_I and μ_{II} is explained by interaction of the unpaired electron in I with the non-separated electron pair of the nitrogen atom; the oxygen atom cedes its partially occupied p orbit to one electron of this pair. Thus the oxygen atom receives a negative charge and the nitrogen atom a positive one. There is 1 table. The most important English-language reference is: Y. Deguchi, Bull. Chem. Soc. Japan, 34, 910 (1961). ✓

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR); Fiziko-khimicheskii institut im. L.Ya. Karpova (Physico-chemical Institute imeni L.Ya. Karpov)

PRESENTED: August 1, 1962, by V.N. Kondrat'yev, Academician

SUBMITTED: August 1, 1962

Card 2/2

BUCHACHENKO, Anatoliy Leonidovich; LEBEDEV, Ya.S., red.; DOROKHINA,
I.N., tekhn. red.

[Stable radicals] Stabil'nye radikaly. Moskva, Izd-vo
AN SSSR, 1963. 170 p. (MIRA 17:1)
(Radicals (Chemistry))

KARGIN, V.A., akademik; NEYMAN, M.B., prof.; BUCHACHENKO, A.L.,
kand. khim. nauk; MIKHAYLOV, V.V.; ~~MASLOVA, I.P.~~;
LUKOVNIKOV, A.F., kand. khim. nauk; MATVEYEVA, Ye.N.;
BERLIN, A.A., prof.; YANOVSKIY, D.M., kand. khim. nauk;
POPOVA, Z.V., kand. khim. nauk; LEVANTOVSKAYA, I.I.;
KOVARSKAYA, B.M., kand. khim. nauk; ANDRIANOV, K.A., prof.;
KUZ'MINSKIY, A.S., prof.; SLONIMSKIY, G.L., prof.; MAKUNI,
Ye.B., tekhn. red.

[Aging and stabilization of polymers] Starenie i stabili-
zatsiia polimerov. Moskva, Izd-vo "Nauka," 1964. 330 p.
(MIRA 17:3)

1. Akademiya nauk SSSR. Institut khimicheskoy fiziki.
2. Chlen-korrespondent AN SSSR (for Andrianov).

NEYMAN, M.B.; FEDOSEYEVA, T.S.; CHUBAROVA, G.V.; BUCHACHENKO, A.L.; LEBEDEV, Ya.
S.

Study of the radicals in irradiated polyformaldehyde. Vysokom.soed. 5
no.9:1339-1344 S '63. (MIRA 17:1)

1. Institut khimicheskoy fiziki AN SSSR.

MEDZHIDOV, A.A.; EUCHACHENKO, A.L.; ROZANTSEV, E.G.; NEYMAN, M.B.

Chromatographic separation of the radicals formed during the
oxidation of hydrogenated 2,2,4-trimethylquinolines. Izv. AN SSSR
Ser.khim. no.10:1713-1717 0 '63. (MIRA 17:3)

1. Institut khimicheskoy fiziki AN SSSR.

BUCHACHENKO, A.L.; NEYMAN, M.B.; SUKHANOVA, O.P.; MAMEDOVA, Yu.G.

Effect of solvents on the reactivity of nitrophenols of different structure in their reaction with the tri-tert-butylphenoxyl radical.
Zhur.fiz.khim. 37 no.1:221-224 Ja '63. (MIRA 17:3)

1. Institut khimicheskoy fiziki AN SSSR.

SOKOLOV, N.D., prof., otv. red.; CHULANOVSKIY, V.M., prof., otv.
red.; BUCHACHENKO, A.L., red.

[Hydrogen bonding] Vodorodnaia sviaz'; sbornik statei.
Moskva, Izd-vo "Nauka," 1964. 339 p. (MIRA 17:8)

1. Akademiya nauk SSSR. Institut khimicheskoy fiziki.

ACCESSION NR: AP4017634

S/0190/64/006/002/0241/0246

AUTHORS: Fedoseyeva, T. S.; Kuz'minskiy, A. S.; Heyman, M. B.; Buchachenko, A. L.;
Lebedev, Ya. S.; Chertkova, V. F.

TITLE: Effect of three-dimensional network on free radical annihilation process in elastomers

SOURCE: Vy'sokomolekulyarnyye soedineniya, v. 6, no. 2, 1964, 241-246

TOPIC TAGS: free radical, sodium-butadiene, thermal vulcanizate, EPR spectra, irradiated specimen, chain segment, activation energy, pre-exponential factor

ABSTRACT: The kinetic properties of free radicals formed in the γ -irradiation of thermally vulcanized sodium-butadiene of various degrees of cross-linkages have been investigated by the EPR method. The thermal vulcanizate was obtained by preliminary heating of the purified polymer in the press at 220C and under 50 t/cm² pressures from 5 to 60 hours. The specimen was irradiated in vacuum at -196C from a Co⁶⁰ source of 25 Mrad dose. The EPR spectra of the irradiated specimen were obtained on the EPR-2 IKhP AN SSSR instrument at -196C in 20 to 100⁰ intervals. It is shown that formation of a three-dimensional network prolongs the lifetime of the

Card 1/2

ACCESSION NR: AP4017634

captured radicals. The rate of annihilation of these radicals decreases with increase in the number of cross-linkages. The rate for the same network density is limited by the mobility of the various chain segments. Furthermore, the activation energies and pre-exponential factors for the annihilation of free radicals in "mobile" and "sluggish" regions of the chain have been determined. Orig. art. has: 5 figures and 1 table.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AN SSSR); Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry)

SUBMITTED: 13Nov62

DATE ACQ: 23Mar64

ENCL: 00

SUB CODE: CH

NO REF SOV: 005

OTHER: 000

Card 2/2

ACCESSION NR: AP4042191

S/0190/64/006/007/1308/1312

AUTHOR: Kuz'minskiy, A. S., Fedoseyeva, T. S., Lebedev, Ya. S., Buchachenko, A. L.,
Zhuravskaya, Ye. V.

TITLE: Nature of the free radicals formed in irradiated polydimethylsiloxanes

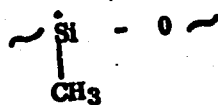
SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 7, 1964, 1308-1312

TOPIC TAGS: polydimethylsiloxane, phenylene derivative, hydroxyphenylene derivative,
irradiation, free radical, Gamma irradiation, electron paramagnetic resonance, EPR
spectrum, polymer radiation effect

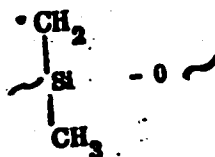
ABSTRACT: The mechanism of action of irradiation on polydimethylsiloxane and its phenylene-
and hydroxyphenylene- containing derivatives during the formation of free radicals was
investigated by subjecting the polymers to γ -irradiation (Co^{60} = 10000 g. equiv. Ra.) at -196°C
in vacuum at a dose of 25 Mrad. Electron paramagnetic resonance spectra showed that two
types of radicals (singlet and triplet) are formed corresponding to

Card 1/3

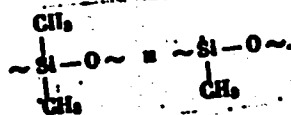
ACCESSION NR: AP4042191



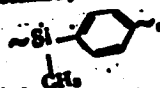
and



The formula for determining the relative concentration of both types of radicals in polydimethylsiloxane is given as:



In phenylene-containing polydimethylsiloxane, the radical



is found, the spectrum of which is determined by the interaction of the unpaired electron

ACCESSION NR: AP4042191

with the ortho and meta protons of the phenylene ring. The kinetic properties of these free radicals were found to depend on the mobility of the polymer chain segments. "The authors wish to express their gratitude to A. L. Klebanskiy and S. B. Dolgaplosk for their continual attention and assistance in this work." Orig. art. has: 3 figures, 1 formula and 5 chemical structures.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promy*shlennosti (Scientific Research Institute of the Rubber Industry); Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AN SSSR)

SUBMITTED: 28Aug63

ENCL: 00

SUB CODE: OC

NO REF SOV: 002

OTHER: 002

Card 3/3

BUCHACHENKO, A.L.; ROZANTSEV, E.G.

Electronic conductivity of tertiary carbon atom. Izv. AN SSSR.
Ser.khim. no.3:556-557 Mr '64. (MIRA 17:4)

1. Institut khimicheskoy fiziki AN SSSR.

ACCESSION NR: AP3006755

S/0190/63/005/009/1339/1344

AUTHORS: Neyman, M. B.; Fedoseyeva, T. S.; Chubarova, G. V.; Buchachenko, A. L.;
Lebedev, Ya. S.

TITLE: A study of the radicals in irradiated polyformaldehyde

SOURCE: Vy^ssokomolekulyarny^e soyedineniya, v. 5, no. 9, 1963, 1339-1344

TOPIC TAGS: free radical, polyformaldehyde, electron paramagnetic resonance, chain
polymer, gamma irradiation, polymer chain/ EPR 2 IKhF spectrometer

ABSTRACT: Structural and kinetic characteristics of free radicals in irradiated
polyformaldehyde (PFA) were investigated. Powdered PFA was placed in soldered and
evacuated ampules and was subjected to gamma radiation from a Co⁶⁰ source. The
study of electron paramagnetic resonance (EPR) radical spectra at low temperatures
was conducted on PFA irradiated at 77K with doses of 5×10^6 and 1×10^7 roentgens.
Spectra were recorded on the spectrometer EPR-2 IKhF. A special ampule was used for
room temperature radiation experiments. The ampule was connected to vacuum equip-
ment to allow varying gas concentrations around the specimens. Means were provided
for controlling the ambient air temperature. Test results indicated: 1) two types

Card 1/2

ACCESSION NR: AP3006755

of radicals are present, the stable $\sim O - CH - O \sim$ radical and short-lived radicals from polymer chain rupture; 2) for the stable radical, defrosting of internal motions of the molecular chains occurs at temperatures below $-196K$. The recombination reaction is described by a second-order equation with the constant rate of recombination given by $k = 10^{-7} \exp(-19\ 000/RT) \text{ cm}^3/\text{sec}$. The value of the annihilation rate constant of radicals is higher in oxygen than in a vacuum and depends linearly upon the pressure: $k = 10^{-9} k_p^{-1} [O_2] \exp(-17\ 000/RT) \text{ cm}^3/\text{sec}$. Orig. art. has: 4 formulas, 8 equations, and 6 figures.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AN SSSR)

SUBMITTED: 19Feb62

ENCL: 00

SUB CODE: GC

NO REF SOV: 008

OTHER: 003

Cord 2/2

L 31813-65 EWT(m)/EPP(c)/EWP(j) Pc-4/Pr-4 RPL RM
ACCESSION NR AM4044430 BOOK EXPLOITATION S/

Duchachenko, Anstoliy Leonidovich

Free radicals (Stabil'nyye radikaly), Moscow, Izd-vo AN SSSR, 1963, 170 p.
illus., biblio. Errata printed on the inside of back cover. 2,000 copies
printed. (At head of title: Akademiya nauk SSSR, Institut khimicheskoy
fiziki).

TOPIC TAGS: chemistry, free radical, stable radical

TABLE OF CONTENTS [abridged]:

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Ch. I. Methods of investigating free radicals -- 6
Ch. II. Stable radicals with trivalent carbon -- 38
Ch. III. Stable radicals of single-valence oxygen -- 55
Ch. IIII. Stable radicals of 2- and 4- valence nitrogen -- 95
Ch. V. Magnetic and electrical properties of radicals -- 137
Ch. VI. Some problems of the use of stable radicals -- 146

Card 1/2

L 31813-65

ACCESSION NR AM 044430

SUBMITTED: 10 Nov 63

SUB CODE: 00

NO REF SOV: 078

OTHER: 161

Card 2/2

BUCHACHENKO, A.L.

Hydrogen bonding in radicals. Dokl. AN SSSR 158 no.4:932-934
O '64. (MIRA 17:11)

1. Institut khimicheskoy fiziki AN SSSR. Predstavleno akademikom
V.N. Kondrat'yevym.

L 61651-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RPL RM
 ACCESSION NR: AP5015592 UR/0062/65/000/005/0911/0914
 541.51

24
 22
 B

AUTHOR: Mamedova, Yu. G.; Buchachenko, A. L.; Neyman, M. B.

TITLE: Reactivity of certain stable radicals

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 5, 1965, 911-914

TOPIC TAGS: free radical, aromatic hydrocarbon, ethylbenzene

ABSTRACT: The purpose of this work was to investigate the elementary event of detachment of a hydrogen atom from ethylbenzene by stable radicals, according to the reaction



Since $k_1 \gg k_2$, the following expression for the rate of disappearance of r_1 applies:

$$-\frac{d(r_1)}{dt} = 2k_2(r_1)(RH) \quad (1)$$

Card 1/2

L 61651-65

ACCESSION NR: AP5015592

where (r_1) is the concentration of the stable radical, and (RH) is the concentration of ethylbenzene. When $(RH) \gg (r_1)$,

$$\lg \frac{(r_1)_t}{(r_1)} = 0.87k(RH)t \quad (2)$$

Treatment of experimental data on the change in the concentration of the stable radical with time using equation (2) produced linear relationships from which the rate constant k of the elementary event was readily obtained, and the activation energies and preexponential factors were calculated. A compensation effect was observed in aromatic nitroso radicals; it is attributed to the interaction of the radicals with the medium; the other radicals, which do not react with the medium to any appreciable extent, do not display the compensation effect. Orig. art. has: 3 figures, 1 table, and 3 formulas.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences, SSSR)

SUBMITTED: 30Jul64
NO REF SOV: 006

ENCL: 00
OTHER: 003

SUB CODE: OC

431
Card 2/2

KHLOPLYANKINA, M.S.; BUCHACHENKO, A.I.; VASIL'YEVA, A.G.; NEYMAN, M.B.

Temperature dependence of cage effect in liquid-phase reactions. Izv.
AN SSSR. Ser. khim. no.7:1296-1298 '65. (MIRA 18:7)

1. Institut khimicheskoy fiziki AN SSSR.

SAKUN, V.P.; BUCHACHENKO, A.L.; ALEKSANDROV, I.V.

Analysis of electron paramagnetic resonance spectra of some poly-radicals in the presence of unpaired electron exchange. Teoret. i eksper. khim. 1 no.2:269-271. Mr-Apr '65. (MIRA 18:7)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

BUCHACHENKO, A.L.; GOLUBEV, V.A.; MEDZHIDOV, A.A.; ROZANTSEV, E.G.

Electron paramagnetic resonance spectra of biradicals having a weak exchange reaction. Teoret. i eksper. khim. 1 no.2:249-253 Mr-Apr '65.
(MIRA 18:7)

1. Institut khimicheskoy fiziki AN SSSR, Moskva.

L 59530-65 EWT(m)/EPF(c)/EWG(m)/EWP(j)/T Pc-4/Px-4 RPL DS/WW/RM

ACCESSION NR: AP5016809

UR/0195/65/006/003/0394/0398

541.124 : 542.943

33
31
B

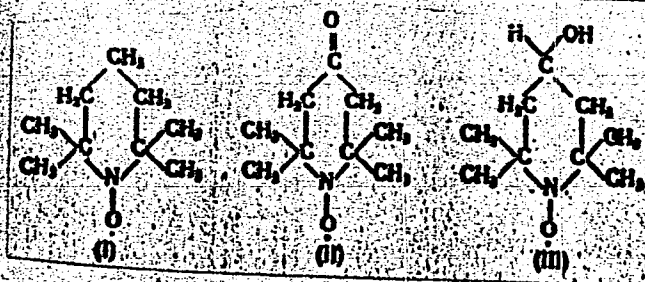
AUTHOR: Khloplyankina, M. S.; Buchachenko, A. L.; Neyman, M. B.; Vasil'yeva, A. G.

TITLE: Mechanism of termination of kinetic oxidation chains by radical stabilizers

SOURCE: Kinetika i kataliz, v. 6, no. 3, 1965, 394-398

TOPIC TAGS: kinetics, free radical, radical stabilizer, oxidation, chain reaction

ABSTRACT: Elementary reactions of inhibition of hydrocarbon oxidation with nitrosyl radicals



Card 1/2

L 59530-65

ACCESSION NR: AP5016809

2
were studied in detail. Effectiveness of termination of kinetic oxidation chains is determined by the competition of nitrosyl radicals and oxygen for R' and RO' radicals, chain carrying species in liquid and solid phase oxidation of individual hydrocarbons and polymers. The ratio of the rate constants of these competing reactions at 60°C is 26 ± 3 for oxidation of ethylbenzene and 1.4 ± 2 for diphenylmethane. Esters of general formula $>N-OR$ result from trapping of R' radicals by nitrosyl radicals. Nitrosyl radicals are useful as radical monitors in determining the rate of initiation of radical-type polymerization and also in studying the cage-effect in the liquid phase radical-type reactions. "In conclusion the authors thank V. Ya. Shlyapintokh for help and interest in the work." Orig. art. has: 1 table, 3 figures, 3 formulas.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AN SSSR)

SUBMITTED: 23Nov63

ENCL: 00

SUB CODE: GC

NO REF SOV: 010

OTHER: 002

llc
Card 2/2

L 27189-65 EWT(m)/EPF(o)/EPH/BWP(j) Pc-l/Pr-l/PS-l RPL BW/WW/JW/JFW/RM

ACCESSION NR: AP5006075

S/0204/65/005/001/0049/0052

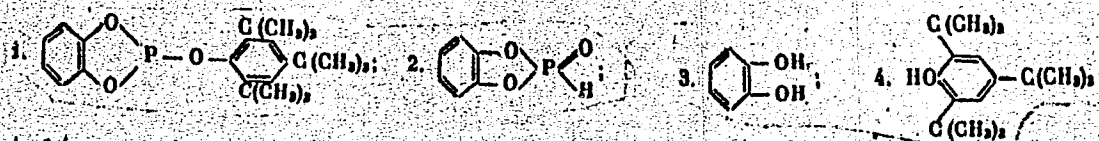
AUTHOR: Khloplyankina, M. S.; Karpukhin, O. N.; Buchachenko, A. L.; Levin, P. I.

TITLE: Mechanism of inhibition by phosphites

SOURCE: Neftekhimiya, v. 5, no. 1, 1965, 49-52

TOPIC TAGS: oxidation, inhibition, inhibitor, hydrocarbon oxidation, polymer oxidation, peroxide, phosphite, chemiluminescence

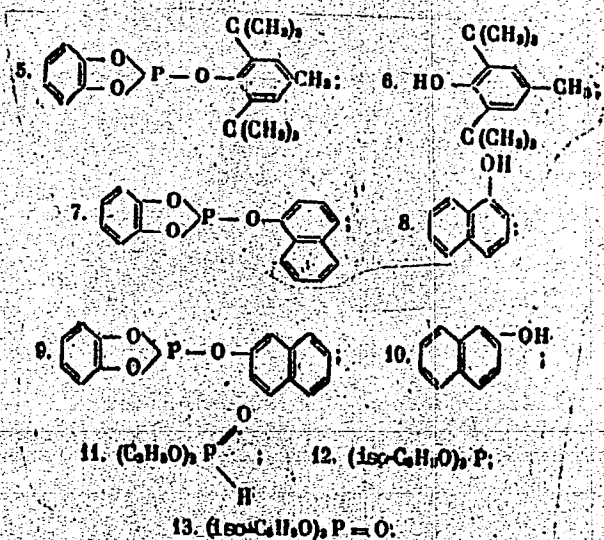
ABSTRACT: A study has been made of the mechanism of the inhibition by phosphites of hydrocarbon and polymer oxidation, as exemplified by the reaction of phosphites with peroxide radicals. A chemiluminescent method, described in an earlier study, of investigating oxidation reactions was used for the reaction at 600C in the presence of azobisisobutyronitrile of ethylphenyl peroxide radicals with the following phosphites, phosphates, or phenols:



Card 1/3

L 27189-65

ACCESSION NR: AP5006075



Card 2/3

1. 27189-65

ACCESSION NR: AP5006075

2

It was found that of the phosphites studied, only aryl phosphites react rapidly; the alkyl phosphites and phosphates hardly reacted at all. Analysis of the data suggested that at 60C, phosphites do not react with peroxide radicals; chemiluminescence quenching by aryl phosphites was attributed to peroxide-radical reaction with partial hydrolysis products of the phosphites. The rate of constants of the reactions of ethylbenzene peroxide radicals with pyrocatechol, and the number of chains terminated by one pyrocatechol molecule, were determined. The authors express their gratitude to V. Ya. Shlyapintokh for his assistance in the research and discussion of the results. Orig. art. has: 1 figure, 1 table, and 21 formulas.

[SM]

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AN SSSR)

SUBMITTED: 28Nov63

ENCL: 00

SUB CODE: 1C, GC

NO REF SOV: 005

OTHER: 003

ATD PRESS: 3191

Card 3/3

VASSERMAN, A.M.; BUCHACHENKO, A.L.; ROZANTSEV, Ye.G.; NBYMAN, M.B.

Dipole moments of molecules and radicals, Di-tert-butyl nitroxide.
Zhur. struk. khim. 6 no.3:467-468 My-Je '65.

(MIRA 18:8)

1. Institut khimicheskoy fiziki AN SSSR.

BUCHACHENKO, A.I.; SUKPAROVA, O.P.; KALASHNIKOVA, L.A.; MEYMAN, M.B.

π -Complexes of radicals and their role in the kinetics of liquid-phase radical reactions. Kin. i kat. 6 no.4:601-606 31-Aug '65.

1. Institut khimicheskoy fiziki AN SSSR.

KUZ'MINSKIY, A.S.; FEDOSEYEVA, T.S.; BUCHACHEIKO, A.L.

Application of the electron paramagnetic resonance method in
elastomer chemistry. Kauch. i rez. 24 no.7:10-14 J1 '65.

(MIRA 18:8)

1. Nauchno-issledovatel'skiy institut **rezinovy** promyshlennosti.
i Institut khimicheskoy fiziki AN SSSR.

MEDZHIDOV, A.A.; BUCHACHENKO, A.L.; NEYMAN, M.B.

Possibility of acid-basic catalysis of radical reactions. Dokl.
AN SSSR 161 no.4:878-881 Ap '65. (MIRA 18:5)

1. Institut khimicheskoy fiziki AN SSSR. Submitted September 22,
1964.

BUCHACHENKO, A.L.; GOLUBEV, V.A.; NEYMAN, M.B.; ROZANTSEV, E.G.

Electron paramagnetic resonance spectra of individual polyradicals.
Dokl. AN SSSR 163 no.6:1416-1418 Ag '65.

(MIRA 18:8)

1. Institut khimicheskoy fiziki AN SSSR. Submitted January 21, 1965.

KHLOPLYANKINA, M.S.; BUCHACHENKO, A.I.; NEYZMAN, M.B.; VASIL'YENVA, A.G.

Mechanism of termination of kinetic oxidation chains by means
of radical stabilizers. *Kin. i kat.* 6 no.3:394-398. *Mg-De '65.*
(MIRA 28:10)

1. Institut khimicheskoy fiziki AN SSSR.

BUCHACHENKO, A.I.; SUKHANOVA, O.P.

Hydrogen bond in radicals with the participation of an unpaired electron. Zhur. strukt. khim. 6 no.1:32-38 Jan '65.

(MIRA 18:12)

I. Institut khimicheskoy fiziki AN SSSR. Submitted November 25, 1963.

SUKHANOVA, O.P.; BUCHACHENKO, A.L.

Mechanism of the effect of hydrogen bonds on the kinetics of radical liquid-phase reactions. Zhur.fiz.khim. 39 no.10:2413-2417 0 '65. (MIRA 18:12)

1. Institut khimicheskoy fiziki AN SSSR. Submitted July 16, 1964.

1-10-11-67 100(1)/100(1) 100

ACC NR: AP7003124

DOUBLED CODE: UR/0122/66/007/002/0187/0191

AUTHOR: Shapiro, A. B.; Buchachenko, A. I.; Medzhidov, A. A.; Rozantsev, E. G. ()

ORG: Institute of Chemical Physics, AN SSSR (Institut khimicheskoy fiziki AN SSSR)

TITLE: Organomercury free radicals

SOURCE: Zhurnal strukturnoy khimii, v. 7, no. 2, 1966, 187-191

TOPIC TAGS: organomercury compound, free radical, EPR spectrum

ABSTRACT: The first representatives of organomercury stable radicals were obtained in solution and their electron paramagnetic spectra were investigated. Hyperfine structure was analyzed for nuclei of magnetic isotopes of mercury. The value of McConnell's constant for isotropic hyperfine interaction with the isotopes Hg^{199} and Hg^{201} was determined. Mercury derivatives of N-ter-butylaniline, 2,2,4-trimethyl-1,2,3,4-tetrahydroquinoline, and 2,2-dimethylindoline were described. The authors thank F. M. Yegidis for furnishing the N-ter-butylaniline. Orig. art. has: 5 figures and 1 table. [JPRS: 38,970]

SUB CODE: 07 / SUBM DATE: 25Jun65 / ORIG REF: 003 / OTH REF: 004

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UDC: 538.113

BUCHACHER, Ye.A.; NEYAGLOV, A.V.; POKHODENKO, N.T.; SHEMYAKIN, A.A.

Improved hydraulic systems for the double end packing of
centrifugal pumps. Mash. i neft. obor. no.4:7-10 '64.
(MIRA 17:6)

1. Bashkirskiy nauchno-issledovatel'skiy institut po
p ererabotke nefti.

BUCHACHER, Ye.A.; KUDINOV, A.M.; NEYAGLOV, A.V.; MIKERIN, B.I.;
MALIYEVSKIY, A.S.

Mixing unit for a sulfuric-acid alkylation contactor with
electric drive. Trudy BashNII NP no.7:56-62 '64.

(MIRA 17:9)

BUCHACHER, Ye.A.; NEYAGLOV, A.V.; POKHODENKO, N.T.; SHEMYAKIN, A.A.

Hydraulic systems of double end packing for centrifugal
pumps. Trudy BashNII NP no.7:62-67 '64. (MIRA 17:9)

BUCHACHER, Ye.A.; KUDINOV, A.M.; NEYAGLOV, A.V.; MIKERIN, B.I.;
MALIYEVSKIY, A.S.

Modernizing the driving unit of a contactor for sulfuric-acid
alkylation. Neftoper. i neftekhim. no.12:36-41 '63. (MIRA 17:4)

1. Bashkirskiy nauchno-issledovatel'skiy institut po pererabotke
nefti i Novo-Ufimskiy neftepererabatyvayushchiy zavod.

NEYAGLOV, A.V.; BUCHACHER, Ye.A.

Designing end packing for centrifugal pumps. Trudy BashNII
NP no.6:251-258 '63.

BUCHACZ, Marian.

Traumatism in skiing. Chir.nars. ruchu 20 no.4:302-308 1955.

1. Z Chirurgicznego Oddzialu Szpitala Miejskiego nr 1 w
Bielsku-Bialej. Dyrektor: dr. W.Ciesla. Bielsko, Szpital
Miejski nr. 1.

(WOUNDS AND INJURIES

in skiing, classif. & ther)

(ATHLETICS

inj. in skiing, classif. & ther)

BUCHACZ, Marian

~~Case of metastatic adenoma of the thyroid gland. Polski~~
prsegl. chir. 28 no.1:73-74 Jan 56.

1. Ze Szpitala Miejskiego nr 1 w Bielsku-Bialej Dyrektor:
dr. W. Ciesla Bielsko, I. Szpital Miejski, Woj. Stalinogrodskie.
(THYROID GLAND, neoplasms,
adenoma, metastatic. (Pol))

BUCHACZ, Marian

Unusual injuries in workers of a molded furniture factory.
Polski przegl. chir. 28 no.1:87-88 Jan 56.

1. Ze Szpitala Miejskiego nr 1 w Bielsku-Bialej Dyrektor:
dr. W. Cieśla Bielsko, L. Szpital Miejski, Woj. Stalinogrodskie.

(HANDS, wds, & inj.

occup., in molded furniture indust. (Pol))

(WOUNDS AND INJURIES,

hand, in molded furniture indust. (Pol))

(OCCUPATIONAL DISEASES,

hand inj. in molded furniture indust. (Pol))

BUCHACZ, Marian

Rare injury of the colon. Polski przegl. chir. 28 no.2:
167-172 Feb 56.

1. Ze Szpitala Miejsk. Nr 1 w Bielsku-Bialej. Dyr.: dr.
W. Ciesla. Bielsko-Biala, Szpital Miejski Nr 1.
(COLON, wounds and injuries.
(WOUNDS AND INJURIES
colon.

BUCHACZ, Marian

Case of diaphragmatic relaxation. Polski przegl. chir. 28 no.
5:525-532 May 56.

1. Z Chirurgicznego Oddziału Szpitala M. Nr 1 w Bielsku-Białej
Dyrektor: dr. W. Ciesla, Bielsko, Szpital Miejski (Wojew.
Stalinogrodzkie).

(DIAPHRAGM, diseases,
relaxation, case report (Pol))

BUCHACZ, Marian

Foreign bodies in the digestive system. Polski przegl. chir. 28
no.6:567-573 June 56.

1. Ze Szpitala Miejskiego Nr 1 w Bielsku-Bialej Dyrektor: dr.
W. Ciesla, Bielsko, Szpital Miejski No. 1.
(GASTROINTESTINAL SYSTEM, foreign bodies,
case reports (Pol))

BUCHACZ, Marian

Calcareous bursitis of the knee. Chir. narząd. ruchu ortop. Pol.
30 no.4:453-457 '65.

1. Z Poradni Chirurgicznej w Białsku-Białej.

AP6033908 / EWT(m) / EWP(t) / ETL IJP(c) JD/AT
 SOURCE CODE: GE/0030/66/017/002/K187/K190

AUTHOR: Yurasova, V. E.; Buchanov, V. M.; Golo, M.

ORG: Physics Department, Moscow State University

TITLE: Directional emission of charged particles from a single crystal under ion bombardment

SOURCE: Physica status solidi, v. 17, no. 2, 1966, K187-K190

TOPIC TAGS: ion bombardment, argon ion, charged particle, particle emission, directional emission

ABSTRACT: The results are presented of a simultaneous investigation of the angular and energy distributions of secondary electrons and ions ejected from the (100) plane of a copper single crystal under 4.5-keV argon ion bombardment. The apparatus used is similar to that described previously by Yurasova et al. (ZhETF, 47, 473, 1964) except that the present collector arrangement was made mobile. The angular distribution within the hemisphere above the target, as a function of the two angles, azimuth angle ϕ and polar angle θ , was measured. The values of these angles were changed by rotating both the target and collector through 2° to 5° . The energy distribution of secondary particles on the ejection angle was studied by the retarding potential method.

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S/536/61/000/050/008/017
D217/D304

AUTHORS: Livanov, V.A., Professor, Buchanova, A.A. and Kolachev,
B.A. Candidates of Technical Sciences

TITLE: Influence of hydrogen on the thermal stability of the
alloy VT-3-1 (VT3-1)

SOURCE: Moscow. Aviatsionnyy tekhnologicheskii institut. Trudy,
no. 50, 1961, Voprosy metallovedeniya, 71-81

TEXT: Specimens of alloy VT-3-1 were annealed in vacuo at 900°C for
6 hours. Mechanical tests were carried out after various isothermal
annealing treatments on specimens of various hydrogen contents, at three
different deformation rates: (a) 40 mm/minute (b) 4 mm/minute and (c)
0.1 mm/minute. After vacuum annealing, the microstructure of the VT3-1
alloy consists of a supersaturated α -solid solution containing a small
quantity of the β -phase. The structure of the alloy on being saturated
with hydrogen immediately after vacuum annealing remains essentially un-
altered. Isothermal annealing at 450°C for 48 hours leads to a

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decomposition of the supersaturated solution and to the precipitation of the $TiCr_2$ phase, by eutectoid decomposition of β . The higher the temperature, the greater the rate of eutectoid decomposition. It is found that isothermal annealing leads to embrittlement of the VT3-1 alloy which is the more pronounced the higher the annealing temperature. Embrittlement is noticeable only after isothermal annealing at 550°C for over 100 hours. Hydrogen lowers the thermal stability of the alloy. The brittleness of an alloy containing more than 0.03% hydrogen manifests itself even after annealing at 350°C for 100 hours. The decrease in thermal stability of a VT3-1 alloy containing hydrogen is due to the fact that the latter accelerates decomposition of the β phase and of the supersaturated α solid solution. Besides, in the presence of hydrogen, Ti hydride or any other phase containing hydrogen, precipitation of phases other than $TiCr_2$ also occurs. Hydrogen lowers the thermal stability of the alloy VT3-1 to a lesser degree than that of the alloy VT3, since the β phase in the former is more stable than in the latter. There are 7 figures and 3 references: 1 Soviet bloc and 2 non-Soviet bloc. The reference to the English-language publication reads

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as follows: R.I. Jaffee, G.A. Lenning, C.M. Craighead, J. of Metals,
1956, no. 8, pp. 907-913.

Card 3/3

X

18 1285

30927

S/536/61/000/050/009/017
D217/D304

AUTHORS: Livanov, V.A., Professor, Buchanova, A.A., and Kolachev,
B.A., Candidates of Technical Sciences

TITLE: Influence of oxygen and hydrogen on the structure and pro-
perties of titanium

SOURCE: Moscow. Aviatsionnyy tekhnologicheskii institut. Trudy,
no. 50, 1961, Voprosy metallovedeniya, 82-92

TEXT: The combined influence of oxygen and hydrogen on the mechanical properties and structure of Russian commercially pure titanium was investigated. Ingots were melted in a laboratory arc furnace, using a soluble segmented electrode. The electrodes were compacted from sponge containing the following impurities: 0.1% Fe, 0.05% Si, 0.05% Mg, 0.05% Cl, 0.1% SO₂, 0.01% H₂, 0.03% N₂ and 0.03% Ni. Oxygen was added to each portion of the electrode in the form of calculated quantities of TiO₂.
By this method, ingots with the following supplementarily added oxygen
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contents were made: 0, 0.06, 0.1, 0.2, 0.3, 0.5 and 1.0 wt.%. After the first remelting, the ingots were ground and forged. The forged billets were then used as electrodes for the second remelting process. The ingots obtained by double remelting were forged into rods of 12 x 12 mm cross section at 980-1000°C. After hot forging, the rods were cooled in air and cut into sections for specimens for mechanical testing. The mechanical test specimens were vacuum annealed at 900°C for 6 hours, after which they were furnace-cooled. They were then saturated with hydrogen to various concentrations. The hydrogen content of the specimens was determined from the change in hydrogen pressure in a system of known volume, and from the gain in weight of the specimens. After being saturated with hydrogen, the specimens were furnace-cooled. Their mechanical properties were determined at room temperature. After testing, the microstructure of undeformed portions of the specimens was studied. The oxygen content of the alloys was determined by the equilibrium pressure of hydrogen introduced into it. It was found that the joint presence of oxygen and hydrogen in Ti greatly affects the structure and properties

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Influence of oxygen ...

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of the latter. At low contents of these impurities (up to 0.3 wt.% O_2 and up to 0.03 wt.% H_2) hydrogen does not exert a noticeable influence on the strength of Ti, but seriously reduces the plasticity characteristics, particularly the impact resistance. At high oxygen contents, hydrogen sharply decreases the strength and plasticity of Ti. In amounts not exceeding 0.5-0.7 wt.%, oxygen sharply increases the U.T.S. and yield strength. 0.01 wt.% oxygen increases the U.T.S. and yield strength of Ti by 1.3 kg/mm². In the joint presence of H_2 and O_2 in Ti and its alloys, a Ti hydride precipitate appears. The latter is characterized by a greater degree of dispersion at greater oxygen contents of Ti. Oxygen does not appear to have a great influence on the solubility of hydrogen in α -titanium at room temperature. There are 12 figures and 6 non-Soviet-bloc references. The 4 most recent references to the English-language publications read as follows: T.S. Liu, M.A. Steinberg, Transaction of the American Society for Metals, 1957, 50, Preprint no. 34; G.A. Lenning, C.M. Craighead, R.I. Jaffee, J. of Metals, 1954, v.6, p. 367; G. Weinig, J. of Metals, 1957, v. 9, no. 10; G.A. Lenning, J.W.

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Influence of oxygen ooo

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Spretnak, R.I. Jaffee, J. of Metals, 1956, v. 8, no. 10.

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18 1285

30928
S/536/61/000/050/010/017
D217/D304

AUTHORS:

Livanov, V.A., Professor, Buchanova, A.A., and Kolachev,
B.A., Candidates of Technical Sciences

TITLE:

Hydrogen embrittlement of titanium-aluminum alloys

SOURCE:

Moscow. Aviatsionnyy tekhnologicheskii institut. Trudy,
no. 50, 1961, Voprosy metallovedeniya, 93-102

TEXT: The purpose of the present work was to investigate the influence of Al, one of the main alloying elements of many industrial Ti alloys, on the hydrogen embrittlement of Ti. To study the influence of Al on the mechanical properties and structure of Russian technically pure Ti in the presence of hydrogen, Ti-Al alloy ingots were made in a laboratory arc furnace, using soluble segmented electrodes. The electrodes were compacted from TiO sponge. Ingots containing 0, 3, 4, 7.5 and 10% Al were made. After the first remelting, the ingots were ground and forged. The forged billets were then used as electrodes for the second melting. The ingots obtained after repeated remelting were forged into rods of

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Hydrogen embrittlement ...

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14 x 14 mm cross section at 1050°C. After hot forging, the rods were cooled in air and cut into sections for specimens for mechanical testing. The specimens were annealed in vacuo at 900 C for 6 hours, after which they were furnace cooled. They were then saturated with hydrogen to various concentrations and again furnace-cooled. Mechanical testing of the hydrogen-saturated specimens was carried out at room temperature. The microstructure was studied, using the undeformed portions of impact test pieces. It was found that Al reduces the tendency of Ti to hydrogen embrittlement; this is due to the increased solubility of hydrogen in the α -solid solution and to the retardation of the diffusion of hydrogen in Ti in the presence of Al. The maximum permissible hydrogen content of a Ti alloy containing 5% Al (VT5) is approximately 0.03%, i.e. twice that permissible for commercially pure Ti. There are 10 figures and 3 non-Soviet-bloc references. The references to the English-language publications read as follows: H.R. Ogden, D.I. Maykath, W.L. Finlay, R.I. Jaffee, J. of Metals, 1953, v. 5, no. 2, II, 267; G.A. Lenning, J.W. Spretnak, R.I. Jaffee, J. of Metals, 1956, vo. 8, no. 10, II.

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P/005/62/000/035/001/001
1004/1204

AUTHOR: Buchanow, W.

TITLE: Cybernetics in cosmic space

PERIODICAL: Przegląd techniczny n. 35, [September 2], 1962, 9

TEXT: In a press interview Academician A. I. Berg commented on the twin space flight of "Vostok 3" and "Vostok 4". The fundamental importance of the first radio contact between two objects in outer space was stressed (Abstracter's note: feasibility of such a contact was never doubted). High quality television transmission from space was a great success. The reliability of electronic equipment was praised. Lower reliability of American electron apparatus in space vehicles he considered as being the result of the American attitude to catch up in the space race at any price, even by launching inadequately checked apparatus. Cybernetics he stated was the main factor which made this twin flight possible. From the computation of the orbit to the medical examination of the pilots after their arrival-all this was performed with a wide use of cybernetics. The difficulty in applying these methods to the orbiting vehicle was the distance between the vehicle and the earth-bound computing center. The inner temperature of the capsule was within 1 to 2°C range from the the the predetermined value. Maintaining the inner temperature within these narrow limits under very severe conditions in outer space was performed by machines employing cybernetic principles. The prolonged twin



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